



Tuesday, August 13, 2019

Ty Woodworth
Great Western Oil and Gas
2005 Howard Smith Ave East
Windsor, CO 80550

Re: ALS Workorder: 1907643
Project Name: N. Colorado 12-13 BH
Project Number:

Dear Mr. Woodworth:

Two water samples were received from Great Western Oil and Gas, on 7/29/2019. The samples were scheduled for the following analyses:

Dissolved Gasses

GC/MS Volatiles

Inorganics

Metals

Total Extractable Petroleum Hydrocarbons (Diesel)

Total Volatile Petroleum Hydrocarbons (Gasoline)

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. O'Brien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



1907643

GC/MS Volatiles:

The sample was analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C.

All acceptance criteria were met.

Dissolved Gasses:

The sample was prepared and analyzed according to method RSK-175 procedures and the current revision of SOP 449.

All acceptance criteria were met.

GRO:

The sample was analyzed following the current revision of SOP 425 generally based on SW-846 Methods 8000C and 8015D. TVPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C6 to C10.

All acceptance criteria were met.

DRO:

The sample was analyzed following the current revision of SOP 406 generally based on SW-846 Methods 8000C and 8015D. TEPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C10 to C28.

All acceptance criteria were met.

Metals:

The samples were analyzed following Methods for the Determination of Metals in Environmental Samples – Supplement 1 procedures. Analysis by ICPMS followed method 200.8 and the current revision of SOP 827.

Sample 1907643-2 was to be analyzed for dissolved metals. The sample was filtered through a 0.45 micron filter and preserved with nitric acid to a pH less than two prior to analysis..

Matrix spike recoveries could not be evaluated for the following analyte:



Analyte
Sodium

Sample ID
1907643-1

The concentration of this analyte in the native sample was greater than four times the concentration of matrix spike added during the digestion. When sample concentration is that much greater than the spike added, spike recoveries may not be accurate. The laboratory control sample indicates that the digestion and analysis were in control.

All acceptance criteria were met.

Inorganics:

The sample was analyzed following EMSL and Standard Method procedures for the current revisions of the following SOPs and methods:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Alkalinity	SM2320B	1106
Bicarbonate	SM2320B	1106
Carbonate	SM2320B	1106
TDS	SM2540C	1101
Chloride	300.0 Revision 2.1	1113
Sulfate	300.0 Revision 2.1	1113

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1907643

Client Name: Great Western Oil and Gas

Client Project Name: N. Colorado 12-13 BH

Client Project Number:

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
12-13 A through E, and G	1907643-1		WATER	28-Jul-19	7:30
12-13 F	1907643-2		WATER	28-Jul-19	7:30



2225 Commerce Drive, Fort Collins, Colorado 80524
 T: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

ALS WORKORDER #

1907643

TURNAROUND TIME		SAMPLER		PAGE		of												
PROJECT NAME	PROJECT No.	SITE ID	EDD FORMAT	PURCHASE ORDER	BILL TO COMPANY	INVOICE ATTN TO	ADDRESS											
N. COLORADO 12-13 BH																		
COMPANY NAME		GWOOD																
SEND REPORT TO		TY WOODWORTH																
ADDRESS																		
CITY / STATE / ZIP																		
PHONE																		
FAX																		
E-MAIL		twoodworth@gwoodco.com																
LAB ID	FIELD ID	MATRIX	SAMPLE DATE	SAMPLE TIME	# OF BOTTLES	PRESERVATIVE	QC	A	B	C	D	E	F	G	H	I	J	SEE NOTES SECTION
1	12-13 A	W	7/28	7:30	3	—		X										
1	12-13 B	W			3	HCL			X									
1	12-13 C	W			3	HCL				X								
1	12-13 D	W			3	HCL					X							
1	12-13 E	W			1	—						X						
	12-13 F	W			1	—							X					
1	12-13 G	W			1	HNO3								X				
Time Zone (Circle):		EST	CST	MST	PST	Matrix: O = oil S = soil NS = non-soil solid W = water L = liquid E = extract F = filter												

REPORT LEVEL / QC REQUIRED		SIGNATURE		PRINTED NAME		DATE		TIME	
RELINQUISHED BY		Kapur M. Miller		Kapur M. Miller		7/27/19		4:45 PM	
RECEIVED BY		[Signature]		Nick Jostes		7.29.19		16:45	
RELINQUISHED BY									
RECEIVED BY									
RELINQUISHED BY									
RECEIVED BY									

PRESERVATION KEY		NOTES	
1-HCl	2-HNO3	3-H2SO4	4-NaOH
5-NaOH/ZnAcetate	6-NaHSO4	7-4°C	8-Other



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Great Western Oil

Workorder No: 1907643

Project Manager: KMO

Initials: EE

Date: 7/31/19

1. Are airbills / shipping documents present and/or removable?		<input checked="" type="radio"/> DROP OFF	YES	NO
2. Are custody seals on shipping containers intact?		<input checked="" type="radio"/> NONE	YES	NO *
3. Are custody seals on sample containers intact?		<input checked="" type="radio"/> NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?		<input checked="" type="radio"/> YES	YES	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	YES	NO *
6. Are short-hold samples present?		<input checked="" type="radio"/> YES	YES	NO *
7. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	YES	NO *
8. Were all sample containers received intact? (not broken or leaking)		<input checked="" type="radio"/> YES	YES	NO *
9. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	YES	NO *
10. Are all samples in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	<input checked="" type="radio"/> YES	YES	NO *
12. Are all aqueous non-preserved samples pH 4-9?	N/A	<input checked="" type="radio"/> YES	YES	NO *
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	<input checked="" type="radio"/> YES	YES	NO *
14. Were the samples shipped on ice?		<input checked="" type="radio"/> YES	YES	NO
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 #3 #4	RAD ONLY	<input checked="" type="radio"/> YES	NO
Cooler #: <u>1</u>				
Temperature (°C): <u>1.8</u>				
No. of custody seals on cooler: <u>0</u>				
External µR/hr reading: <u>N/A</u>				
Background µR/hr reading: <u>8</u>				
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO <input checked="" type="radio"/> NA (If no, see Form 008.)				

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

5) amber vial received without labels, assigned bottles 1-3 of sample 1 as those were the only bottles without labels, so through process of elimination
13) ... 7643-1-1, ..., -12 all have significant (>6mm) headspace

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____

Date/Time: _____

Project Manager Signature / Date: _____

[Signature] 7/31/19

ALS -- Fort Collins

SAMPLE SUMMARY REPORT

Client: Great Western Oil and Gas

Date: 13-Aug-19

Project: N. Colorado 12-13 BH

Work Order: 1907643

Sample ID: 12-13 A through E, and G

Lab ID: 1907643-1

Legal Location:

Matrix: WATER

Collection Date: 7/28/2019 07:30

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Alkalinity as Calcium Carbonate			SM2320B		Prep Date: 8/2/2019	PrepBy: LMC
BICARBONATE AS CaCO3	240		20	MG/L	1	8/2/2019
CARBONATE AS CaCO3	250		20	MG/L	1	8/2/2019
TOTAL ALKALINITY AS CaCO3	490		20	MG/L	1	8/2/2019
Diesel Range Organics			SW8015M		Prep Date: 8/6/2019	PrepBy: LML
Diesel Range Organics	5	M	0.52	MG/L	1	8/7/2019 12:41
Surr: O-TERPHENYL	86		63-126	%REC	1	8/7/2019 12:41
Dissolved Gasses			RSK175		Prep Date: 8/9/2019	PrepBy: LML
METHANE	14000		1	UG/L	1	8/9/2019 14:39
ETHANE	2000		4	UG/L	2	8/9/2019 15:05
PROPANE	1400		1	UG/L	1	8/9/2019 14:39
Gasoline Range Organics			SW8015		Prep Date: 8/1/2019	PrepBy: LML
GASOLINE RANGE ORGANICS	1.3	G	0.1	MG/L	1	8/1/2019 14:46
Surr: 2,3,4-TRIFLUOROTOLUENE	102		74-129	%REC	1	8/1/2019 14:46
GC/MS Volatiles			SW8260_25		Prep Date: 7/31/2019	PrepBy: CCL
BENZENE	140		5	UG/L	5	7/31/2019 16:50
TOLUENE	100		5	UG/L	5	7/31/2019 16:50
ETHYLBENZENE	9.1		5	UG/L	5	7/31/2019 16:50
M+P-XYLENE	10		5	UG/L	5	7/31/2019 16:50
O-XYLENE	16		5	UG/L	5	7/31/2019 16:50
TOTAL XYLENES	27		1	UG/L	1	7/31/2019 16:50
Surr: 4-BROMOFLUOROBENZENE	105		85-115	%REC	5	7/31/2019 16:50
Surr: DIBROMOFLUOROMETHANE	99		84-118	%REC	5	7/31/2019 16:50
Surr: TOLUENE-D8	102		85-115	%REC	5	7/31/2019 16:50
Ion Chromatography			EPA300.0		Prep Date: 8/1/2019	PrepBy: LML
CHLORIDE	1100		20	MG/L	100	8/1/2019 17:59
SULFATE	ND		10	MG/L	10	8/5/2019 16:54
Total Recoverable Metals by 200.8			EPA200.8		Prep Date: 8/5/2019	PrepBy: JML
CALCIUM	4200		1000	UG/L	10	8/5/2019 19:19
POTASSIUM	4800		1000	UG/L	10	8/5/2019 19:19
MAGNESIUM	ND		100	UG/L	10	8/5/2019 19:19
SODIUM	860000		1000	UG/L	10	8/5/2019 19:19
Total Dissolved Solids			SM2540C		Prep Date: 8/1/2019	PrepBy: LMC
TOTAL DISSOLVED SOLIDS	2300		80	MG/L	1	8/2/2019

Client: Great Western Oil and Gas

Date: 13-Aug-19

Project: N. Colorado 12-13 BH

Work Order: 1907643

Sample ID: 12-13 F

Lab ID: 1907643-2

Legal Location:

Matrix: WATER

Collection Date: 7/28/2019 07:30

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	-----------------	-------	--------------------	---------------

Dissolved Metals by 200.8**EPA200.8**

Prep Date: 8/5/2019

PrepBy: JML

CALCIUM	4500		1000	UG/L	10	8/5/2019 19:37
POTASSIUM	4900		1000	UG/L	10	8/5/2019 19:37
MAGNESIUM	ND		100	UG/L	10	8/5/2019 19:37
SODIUM	880000		1000	UG/L	10	8/5/2019 19:37

Client: Great Western Oil and Gas

Date: 13-Aug-19

Project: N. Colorado 12-13 BH

Work Order: 1907643

Sample ID: 12-13 F

Lab ID: 1907643-2

Legal Location:

Matrix: WATER

Collection Date: 7/28/2019 07:30

Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
----------	--------	------	--------------	-------	-----------------	---------------

Explanation of Qualifiers**Radiochemistry:**

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:

- gasoline

- JP-8

- diesel

- mineral spirits

- motor oil

- Stoddard solvent

- bunker C

ALS -- Fort Collins

Date: 8/13/2019 3:59:

Client: Great Western Oil and Gas

Work Order: 1907643

Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: HC190801-62-1

Instrument ID: FUELS-1

Method: SW8015

LCS	Sample ID: HC190801-62				Units: MG/L		Analysis Date: 8/1/2019 12:39				
Client ID:	Run ID: HC190801-6AA				Prep Date: 8/1/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.498	0.1	0.5		100	79-118				20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.0978		0.1		98	74-129					

LCSD	Sample ID: HC190801-62				Units: MG/L		Analysis Date: 8/1/2019 15:29				
Client ID:	Run ID: HC190801-6AA				Prep Date: 8/1/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	0.481	0.1	0.5		96	79-118		0.498	3	20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.0993		0.1		99	74-129			2		

MB		Sample ID: HC190801-62		Units: MG/L		Analysis Date: 8/1/2019 13:01	
Client ID:		Run ID: HC190801-6AA		Prep Date: 8/1/2019		DF: 1	
Analyte		Result	ReportLimit	Qual			
GASOLINE RANGE ORGANICS		ND	0.1				
Surr: 2,3,4-TRIFLUOROTOLUENE		0.101		101	74-129		

The following samples were analyzed in this batch:

1907643-1

Client: Great Western Oil and Gas
Work Order: 1907643
Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **HC190806-81-1** Instrument ID **FUELS-1** Method: **SW8015M**

LCS	Sample ID: HC190806-81			Units: MG/L			Analysis Date: 8/7/2019 11:58				
Client ID:	Run ID: HC190807-8A				Prep Date: 8/6/2019		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Diesel Range Organics	7.01	0.533	8.33		84	36-150				20	
Surr: O-TERPHENYL	1.6		1.67		96	63-126					

LCSD	Sample ID: HC190806-81			Units: MG/L			Analysis Date: 8/7/2019 12:19				
Client ID:	Run ID: HC190807-8A				Prep Date: 8/6/2019		DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Diesel Range Organics	7.48	0.533	8.33		90	36-150		7.01	6	20	
Surr: O-TERPHENYL	1.64		1.67		99	63-126			2		

MB	Sample ID: HC190806-81	Units: MG/L				Analysis Date: 8/7/2019 11:36			
Client ID:	Run ID: HC190807-8A				Prep Date: 8/6/2019				DF: 1
Analyte	Result	ReportLimit							Qual
Diesel Range Organics	ND	0.53							
Surr: O-TERPHENYL	1.58		95	63-126					

The following samples were analyzed in this batch:

1907643-1

Client: Great Western Oil and Gas
Work Order: 1907643
Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **HC190809-91-1** Instrument ID **MEE-1** Method: **RSK175**

LCS		Sample ID: HC190809-91			Units: UG/L			Analysis Date: 8/9/2019 14:24			
Client ID:		Run ID: HC190809-9A			Prep Date: 8/9/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
METHANE	158	1	142		111	80-120				25	
ETHANE	276	2	267		103	80-120				25	
PROPANE	409	1	391		105	80-120				25	

LCSD		Sample ID: HC190809-91			Units: UG/L			Analysis Date: 8/9/2019 15:07			
Client ID:		Run ID: HC190809-9A			Prep Date: 8/9/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
METHANE	152	1	142		107	80-120		158	4	25	
ETHANE	266	2	267		100	80-120		276	4	25	
PROPANE	389	1	391		99	80-120		409	5	25	

MB		Sample ID: HC190809-91			Units: UG/L			Analysis Date: 8/9/2019 14:27			
Client ID:		Run ID: HC190809-9A			Prep Date: 8/9/2019			DF: 1			
Analyte	Result	ReportLimit									Qual
METHANE	ND	1									
ETHANE	ND	2									
PROPANE	ND	1									

The following samples were analyzed in this batch:

1907643-1

Client: Great Western Oil and Gas
 Work Order: 1907643
 Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **IP190805-7-2** Instrument ID **ICPMS2** Method: **EPA200.8**

LCS	Sample ID: IM190805-7				Units: UG/L		Analysis Date: 8/5/2019 18:35				
Client ID:		Run ID: IM190805-10A10				Prep Date: 8/5/2019			DF: 10		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CALCIUM	10100	1000	10000		101	85-115				20	
MAGNESIUM	9550	100	10000		96	85-115				20	
POTASSIUM	4670	1000	5000		93	85-115				20	
SODIUM	9030	1000	10000		90	85-115				20	

MB		Sample ID: FP190801-7		Units: UG/L		Analysis Date: 8/5/2019 18:29	
Client ID:		Run ID: IM190805-10A10		Prep Date: 8/5/2019		DF: 10	
Analyte		Result	ReportLimit	Qual			
CALCIUM		ND	1000				
MAGNESIUM		ND	100				
POTASSIUM		ND	1000				
SODIUM		ND	1000				

MB		Sample ID: IP190805-7			Units: UG/L		Analysis Date: 8/5/2019 18:32	
Client ID:		Run ID: IM190805-10A10			Prep Date: 8/5/2019		DF: 10	
Analyte		Result	ReportLimit		Qual			
CALCIUM		ND	1000					
MAGNESIUM		ND	100					
POTASSIUM		ND	1000					
SODIUM		ND	1000					

MS		Sample ID: 1907643-1				Units: UG/L		Analysis Date: 8/5/2019 19:25			
Client ID: 12-13 A through E, and G				Run ID: IM190805-10A10				Prep Date: 8/5/2019		DF: 10	
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CALCIUM	14100	1000	10000	4200	100	70-130				20	
MAGNESIUM	9560	100	10000	100	96	70-130				20	
POTASSIUM	9750	1000	5000	4800	98	70-130				20	
SODIUM	881000	1000	10000	860000	174	70-130				20	

Client: Great Western Oil and Gas
Work Order: 1907643
Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **IP190805-7-2** Instrument ID **ICPMS2** Method: **EPA200.8**

MSD Sample ID: **1907643-1** Units: **UG/L** Analysis Date: **8/5/2019 19:28**
Client ID: **12-13 A through E, and G** Run ID: **IM190805-10A10** Prep Date: **8/5/2019** DF: **10**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CALCIUM	14400	1000	10000	4200	102.9	70-130		14100		20	
MAGNESIUM	9480	100	10000	100	95	70-130		9560		20	
POTASSIUM	9660	1000	5000	4800	96.3	70-130		9750		20	
SODIUM	879000	1000	10000	860000	160.1	70-130		881000		20	

The following samples were analyzed in this batch:

1907643-1	1907643-2
-----------	-----------

Client: Great Western Oil and Gas
 Work Order: 1907643
 Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **VL190731-3-2** Instrument ID **HPV3** Method: **SW8260_25**

LCS		Sample ID: VL190731-3			Units: %REC		Analysis Date: 7/31/2019 12:07				
Client ID:		Run ID: VL190731-3A			Prep Date: 7/31/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	25.7		25		103	85-115					
Surr: DIBROMOFLUOROMETHANE	25.7		25		103	84-118					
Surr: TOLUENE-D8	24.8		25		99	85-115					
BENZENE	9.45	1	10		95	83-117				20	
TOLUENE	9.48	1	10		95	82-113				20	
ETHYLBENZENE	9.35	1	10		94	81-113				20	
M+P-XYLENE	18.9	1	20		95	82-115				20	
O-XYLENE	9.55	1	10		96	81-115				20	

LCSD		Sample ID: VL190731-3			Units: %REC		Analysis Date: 7/31/2019 12:29				
Client ID:		Run ID: VL190731-3A			Prep Date: 7/31/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
Surr: 4-BROMOFLUOROBENZENE	25.6		25		103	85-115			0		
Surr: DIBROMOFLUOROMETHANE	26.7		25		107	84-118			4		
Surr: TOLUENE-D8	24.5		25		98	85-115			1		
BENZENE	9.51	1	10		95	83-117		9.45	1	20	
TOLUENE	9.76	1	10		98	82-113		9.48	3	20	
ETHYLBENZENE	9.78	1	10		98	81-113		9.35	4	20	
M+P-XYLENE	19.3	1	20		96	82-115		18.9	2	20	
O-XYLENE	9.79	1	10		98	81-115		9.55	2	20	

MB		Sample ID: VL190731-3		Units: %REC		Analysis Date: 7/31/2019 13:14	
Client ID:		Run ID: VL190731-3A		Prep Date: 7/31/2019		DF: 1	
Analyte	Result	ReportLimit					Qual
Surr: 4-BROMOFLUOROBENZENE	26.2				105	85-115	
Surr: DIBROMOFLUOROMETHANE	25.2				101	84-118	
Surr: TOLUENE-D8	26				104	85-115	
BENZENE	ND	1					
TOLUENE	ND	1					
ETHYLBENZENE	ND	1					
M+P-XYLENE	ND	1					
O-XYLENE	ND	1					
TOTAL XYLENES	ND	1					

The following samples were analyzed in this batch:

1907643-1

Client: Great Western Oil and Gas
Work Order: 1907643
Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **AK190802-1-1** Instrument ID **NONE** Method: **SM2320B**

LCS	Sample ID: AK190802-1			Units: MG/L			Analysis Date: 8/2/2019				
Client ID:		Run ID: AK190802-1a1			Prep Date: 8/2/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
TOTAL ALKALINITY AS CaCO3	105	5	100		105	85-115				15	

MB		Sample ID: AK190802-1		Units: MG/L		Analysis Date: 8/2/2019	
Client ID:		Run ID: AK190802-1a1		Prep Date: 8/2/2019		DF: 1	
Analyte		Result	ReportLimit	Qual			
BICARBONATE AS CaCO3		ND	5				
CARBONATE AS CaCO3		ND	5				
TOTAL ALKALINITY AS CaCO3		ND	5				

The following samples were analyzed in this batch:

1907643-1

Client: Great Western Oil and Gas
Work Order: 1907643
Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **IC190801-1-1** Instrument ID **IC3** Method: **EPA300.0**

LCS	Sample ID: IC190801-1				Units: MG/L		Analysis Date: 8/1/2019 10:48				
Client ID:	Run ID: IC190801-1A1				Prep Date: 8/1/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CHLORIDE	10.4	0.2	10		104	90-110				15	
SULFATE	51.8	1	50		104	90-110				15	

LCSD		Sample ID: IC190801-1				Units: MG/L		Analysis Date: 8/1/2019 13:14			
Client ID:		Run ID: IC190801-1A1				Prep Date: 8/1/2019		DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
CHLORIDE	10.4	0.2	10		104	90-110		10.4	0	15	
SULFATE	51.7	1	50		103	90-110		51.8	0	15	

MB		Sample ID: IC190801-1		Units: MG/L		Analysis Date: 8/1/2019 11:00	
Client ID:		Run ID: IC190801-1A1		Prep Date: 8/1/2019		DF: 1	
Analyte		Result	ReportLimit				
CHLORIDE		ND	0.2				
SULFATE		ND	1				

The following samples were analyzed in this batch:

1907643-1

Client: Great Western Oil and Gas
Work Order: 1907643
Project: N. Colorado 12-13 BH

QC BATCH REPORT

Batch ID: **TD190801-2-1** Instrument ID **Balance** Method: **SM2540C**

DUP		Sample ID: 1907643-1				Units: MG/L		Analysis Date: 8/2/2019			
Client ID: 12-13 A through E, and G			Run ID: TD190801-1A1			Prep Date: 8/1/2019			DF: 1		
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	2220	80						2300	2	5	

LCS	Sample ID: TD190801-2			Units: MG/L			Analysis Date: 8/2/2019				
Client ID:		Run ID: TD190801-1A1			Prep Date: 8/1/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
TOTAL DISSOLVED SOLIDS	405	20	400		101	85-115				30	

MB		Sample ID: TD190801-2		Units: MG/L		Analysis Date: 8/2/2019	
Client ID:		Run ID: TD190801-1A1		Prep Date: 8/1/2019		DF: 1	
Analyte		Result	ReportLimit				
TOTAL DISSOLVED SOLIDS		ND	20				

The following samples were analyzed in this batch:

1907643-1